

Preface

The Great 2004 Sumatra-Andaman earthquake generated a giant tsunami which propagated across the Indian Ocean and caused an unprecedented disaster in the region. Recent digital seismic data, digital tsunami waveforms, GPS data, satellite altimetry data and field survey data all provide new insights on the source process of this massive earthquake and also the cause of the catastrophic tsunami. This special issue of *Earth, Planets and Space* contains 20 papers on the 26 December 2004 Sumatra-Andaman earthquake and tsunami. A wide range of multidisciplinary investigations are presented in this issue, including the results of seismological, geodetic, ionospheric, and tsunami studies.

Two papers discuss results from seismological investigations. Ariaki *et al.* study the aftershock distribution off northern Sumatra using an ocean bottom seismographic observation system deployed immediately after the event. Kanjo *et al.* discuss improvements in a method to rapidly estimate moment magnitude using *P*-waves for magnitude 9 earthquakes, as a result of the Sumatra earthquake.

Six papers present results of using Global Positioning System (GPS) data to study the source process of the 2004 Sumatra-Andaman earthquake and associated phenomena. Among them, three papers, Hashimoto *et al.*, Kreemer *et al.*, and Fu and Sun, analyze crustal deformation from the earthquake using GPS observations. Ohta *et al.* study large surface waves excited by the earthquake, observed from 1-Hz GPS data. Otsuka *et al.* and DasGupta *et al.* discuss ionospheric disturbances due to the earthquake observed by the GPS.

Two papers, Kitagawa *et al.* and Sil and Freymueller, discuss groundwater level changes due to the 2004 earthquake in Japan and Alaska, respectively.

Nine papers present the results of tsunami investigations. Geist *et al.* discuss differences in tsunami generation between the December 26, 2004 and March 28, 2005 earthquakes. Two papers present an analysis of the 2004 earthquake source process using the tsunami waveform data. Hirata *et al.* estimate a source model using tsunami waveforms observed by satellite altimetry measurements. Tanioka *et al.* estimate the rupture process of the earthquake using tsunami waveforms recorded by tide gauges. Nagarajan *et al.* determine the characteristics of the tsunami along the India and Sri Lanka coast using tide gauge data. Abe studies the dominant periods of the tsunami using tide gauge data. Four papers present the results of field surveys in the aftermath of the tsunami. Tsuji *et al.* present the results of a tsunami survey and tide gauge data in Thailand. Papadopoulos *et al.* present the results of tsunami field observations in Sri Lanka, the Maldives, and Thailand. Satake *et al.* present an investigation on tsunami heights and damage along the Myanmar coast. Moore *et al.* analyze sedimentary deposits from the tsunami on the northwest coast of Sumatra.

Finally, Gokarn *et al.* study the geoelectric structure in the Andaman Islands from magnetotelluric data. For various practical reasons, some of the papers initially submitted to this special issue had to be transferred to regular EPS issues.

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